40 MARSHALL STAR

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TABES '98 Will Highlight Marshall's Research

The South's premiere Technical and Business Exhibition/ Symposium, TABES '98, will focus on "Advancing on the Future" May 12-13 at the Von Braun Center.

"Advancing on the Future" is also the focus for TABES Space Symposium chairmembers Sally Little and Al Jordan of Marshall's Technology Transfer Office.

"TABES exhibits and attendance have consistently grown each year since it began 14 years ago and this year should break new records as well," said Little, director of Marshall's Technology Transfer Office. "This is why Marshall's involvement is so important. This event serves as a catalyst, bringing representatives together from government, industry and education."

"Taking on an active role in this event is just part of our job," said Jordan, Technology Transfer management analyst.

Marshall Center exhibits will include composites manufacturing, metal coatings application, high-speed machining, rapid prototyping and friction stir welding. Research at the Center's Space Sciences Laboratory will be highlighted, as well as spinoffs resulting from technology transfer. The exhibits will feature technology displays, space-program related consumer

*See **TABES '98** page 5*

Public Service Recognition Week

This week we salute the millions of Americans across our country who devote their time and talents to public service.

Public service is among the most noble — and demanding — of vocations. Throughout my years in government, I have been privileged to know and work with extraordinary men and women who have recognized both the responsibilities of public service and the opportunities it offers to improve the quality of life for others.

Day in and day out, in a variety of settings at every level of government, these quiet heroes work to give their fellow citizens the tools and opportunities to make the most of their lives. Providing vital family, health and educational services, improving transportation and water quality, defending our freedom and preserving our environment, each day public employees meet the needs of a dynamic and diverse population. They have succeeded in making government work better and cost less, in forging effective partnerships at all levels of government, and in honoring the trust placed in them by their fellow citizens.

On behalf of a grateful nation, I salute America's public employees for the hope and help you bring individuals, families, and communities every day. You have dedicated your skills and energy to fulfill America's bright promise for all our people, and you have earned the respect and lasting appreciation of all those you have served.

Best wishes for a memorable observance.

Center Observes Asian-Pacific American Heritage During May

Dr. Lynn Chou, Asian-Pacific American Heritage chairman, presents a proclamation designating the month of May as Asian-Pacific American Heritage Month, to Marshall Center Acting Director Carolyn Griner. This is a joint effort with Marshall and Army committee members from Redstone Arsenal.

Photo by Adeline Byford

Marshall Recognizes Public Service Week

The 14th annual Public Service Recognition Week is being celebrated May 4-10.

Celebrated nationally, it is a time set aside to educate Americans about the broad variety of services provided by the government and to recognize the services public employees at the federal, state and local levels provide to ensure our government is among the best in the world.

Under the leadership of the U.S. Office of Personnel Management, Marshall and public service personnel served on a committee to plan local activities, including an essay contest among Huntsville and Madison County schools.

Assistance Program Leads to Increased Productivity

by Dr. Bruce Mather

The Employee Assistance Program (EAP), developed at Marshall, assists Center employees and their immediate family members in dealing with work and personal issues which may increase stress and detract from peak performance.

Documentation has validated that if there is a problem at home it is usually carried to the work setting, thereby reducing productivity. Also, a problem at work is carried home causing the family into acting dysfunctional. The EAP provides services for employees and family members experiencing emotional stress, mental health disorders, family or relationship difficulties, financial and/or legal concerns, alcohol and other drug problems.

The EAP is committed to providing compassionate care and employee advocacy in an atmosphere of complete confidentiality. All EAP professional interviews begin by signing a form which explains confidentiality limits.

The EAP also provides access to individual and group discussions, stress reduction techniques and literature. Group sessions can be given at the work setting by invitation.

Additionally, the Center's Lunch & Learn Program is managed by the EAP. If you have a topic which you believe may be of interest to employees and their family members, please notify the EAP.

Dr. Bruce Mather's office is located in Marshall's Medical Center, Bldg. 4249. He is the primary point of contact for EAP and can be reached at 544-7549. Mather is a counseling psychologist who provides initial short-term, confidential counseling and, if deemed necessary, appropriate referral to outside sources.

NASA Signs Licensing Agreement for Further Development of Energy-saving Device

by Steve Calatrello

The term "power factor controller" is not exactly a household phrase. But the device itself is at work in countless homes and businesses — quietly saving electrical energy.

Now, with the signing of an exclusive licensing agreement between NASA and Power Efficiency Corp. of Hackensack, N.J., the stage has been set for even wider use of the device and further conservation of scarce energy resources.

Invented in the early 1980s at Marshall Center by now-retired NASA engineer Frank Nola, the power factor controller senses the amount of power needed by an electric motor. The device then varies the power according to the need. Laboratory tests show the controller can trim power usage by 6 to 8 percent under normal demand conditions, and by as much as 65 percent when a motor is idling.

With such remarkable potential for energy savings, the power factor controller quickly became one of NASA's most widely adopted "spin-off" technologies...

With such remarkable potential for energy savings, the power factor controller quickly became one of NASA's most widely adopted "spin-off" technologies, incorporated in machines ranging from household refrigerators and washing machines to typewriters, kidney dialysis and industrial drilling machines and scores of other commercial products.

Initially, more than 20 companies sought and were granted non-exclusive licenses for commercial use of the invention, said Bob Broad, chief intellectual property counsel at Marshall. "NASA believes Power Efficiency Corp., one of the first companies to hold a non-exclusive license agreement, has distinguished itself and demonstrated the commitment necessary to develop the technology further," said Broad.

Nicholas Anderson, president of Power Efficiency Corp., said, "Our success in marketing our energy-saving motor controllers is directly attributed to the relationship developed over the years between Power Efficiency Corp. and NASA. This relationship proves that great benefits can occur when individuals and government work together to develop technologies that reduce energy consumption."

Under the terms of the agreement, Power Efficiency will pay royalties to NASA and inventor Nola until 2001, when the patent and the exclusive licensing agreement expire.

American businesses like Power Efficiency Corp. consistently benefit from NASA's research and development expertise. Technologies developed for the space program have enabled American industry to introduce more than 900 new or improved products for sale at home and abroad. This assistance to American business and industry is presently valued at $1.6 billion.

Businesses wishing to discuss ways in which NASA technical assistance programs might benefit them may call 1-800-USA-NASA. For more information on Marshall's Technology Transfer Office, visit its website at:

http://www.techtran.msfc.nasa.gov

Open House Volunteer Briefings Planned for Thurs., Fri. and Mon.

Briefings for Open House '98 volunteers are scheduled for Thursday, Friday and Monday, from 1:30-2:30 p.m. in Morris Auditorium. Open House T-shirts will be distributed after the briefings.

Hydrology Center Begins New "Urban Forest" Study

by Kelly McFalls

Marshall's Global Hydrology and Climate Center will partner with the Environmental Protection Agency (EPA) and three U.S. cities to study how strategically placed "urban forests" and the use of reflective surfaces may help cool cities, reduce pollution, lower energy bills, modify growth plans and help mitigate further deterioration of air quality. Slated to participate in the study, scheduled for May, June and July, are Baton Rouge, La.; Sacramento, Calif.; and Salt Lake City.

Researchers from Marshall will study bubble-like accumulations of hot air, called urban heat islands, and how these change between day and night. Heat islands develop over cities as naturally vegetated surfaces are replaced with asphalt, concrete, rooftops and other man-made materials.

"The artificial materials store much of the Sun's energy and remain hot long after sunset," said the experiment's lead investigator, Dr. Jeff Luvall of the Global Hydrology and Climate Center at Marshall. "This produces a dome of elevated temperatures over a city, 5-10 degrees higher than air temperatures over adjacent rural areas," he explained.

"The more a city grows — replacing trees and grass with buildings and roads — the warmer it becomes, increasing peak electricity demands. To meet these demands, power plants must utilize fossil fuels to a greater extent, which ultimately has a negative impact on air quality," said Luvall.

To better understand which surfaces contribute or drive the development of heat islands, an aircraft equipped with thermal imaging equipment will fly over the three cities taking high resolution thermal measurements.

Researchers also will use thermal satellite imagery to map and measure "hot spots" and visible energy rising up into the lower atmosphere of the target cities.

Science team members will use the thermal imagery in meteorologicaland air quality models, allowing researchers to better understand how cities in different locations and with different land use characteristics impact local and regional climate.

Additionally, the EPA will use the satellite imagery to determine how urban heat islands contribute to the ground-level generation of ozone. Not to be confused with the ozone layer protecting Earth from ultraviolet rays, ground-level ozone is a powerful and dangerous respiratory irritant found in cities during the summer's hottest months.

In findings from similar studies in Huntsville and Atlanta, Ga., researchers have learned that parks and other urban areas with trees and grass are cooler than parking lots and areas with a high concentration of buildings.

"These 'green areas' are cooler because they dissipate solar energy by using it to evaporate water from leaves, thereby cooling the air," said the experiment's co-investigator, Dr. Dale Quattrochi of the Global Hydrology and Climate Center.

Researchers believe that cities could be "cooled" by reintroducing vegetated areas, such as "urban forests," into the cities. Certain varieties of trees shade buildings, preventing solar heating, and are able to naturally cool a city as they release moisture into the air and provide shade over urban surfaces.

Another way to cool cities, the science team believes, is by using reflective surfaces, such as light-colored roofs, roads and parking lots. Light-colored surfaces reflect rather than absorb heat.

The researchers want to demonstrate that by "cooling" a city, it is possible to directly reduce energy use by buildings, which in turn reduces greenhouse gas emissions and ultimately improves the air quality.

"Essentially, we want to help cities develop a tool that allows them to better plan for long-term sustainable urban development," said Luvall. NASA, the EPA and the cities to be studied will work in concert with air quality offices, universities, business communities, and state and local officials to quantify potential reductions in smog, and find cost-effective means of implementing measures to cool the cities.

Based on the results of the project, the science team plans to disseminate its findings nationally so other cities also can incorporate what the team has learned into their long-range growth plans. The science team is composed of researchers from Marshall, the EPA and Lawrence Berkeley National Laboratory in Berkeley, Calif.

The study contributes to NASA's Earth Science enterprise. The enterprise is responsible for a long-term research effort to study the total Earth system and the effects of natural and human-induced changes on the global environment.

Marshall's Open House Attractions Are Numerous

The doors to an array of exciting activities will open to the public on May 16 at Marshall. Model rocket launches, like this one from last year's Open House, are big crowd pleasers. ***Photo by Jack Ray***

ISO 9000 Surveillance Audit at Marshall Center Will Focus on Six Elements May 6-8

A National Quality Assurance ISO 9000 surveillance audit of Marshall will be conducted May 6-8. This audit will focus on six specific ISO elements — Management Responsibility, Control of Customer Supplied Product, Corrective and Preventative Action, Control of Quality Records, Internal Quality Audits and Training. Actions taken to correct non-compliances and observations identified during February's registration audit will also be verified.

Computer Sciences Corp. Awarded $131 Million Contract Option to Continue Services at Marshall

Marshall Center has exercised an option to continue an existing contract with Computer Sciences Corp. (CSC), Falls Church, Va., for the provision of a myriad of information services to Marshall and to NASA agencywide.

The priced option, valued at $131,845,510, covers the period May 1, 1998, through April 30, 1999. It continues efforts under a contract titled Program Information Systems Mission Services (PrISMS), which was awarded to CSC in 1994.

Work performed by CSC and its subcontractors under PrISMS includes support to Marshall in the areas of computer systems, applications software, networks and telephone systems, data reduction and audio-video services.

It also includes a range of services in support of the entire agency, including management of several wide-area networks, agencywide information management systems, and the NASA Automated Data Processing Consolidation Center.

The option is the third of a possible six priced options. The PrISMS contract has an approximate total value, if all options are exercised, of $1.053 billion.

New Center Offers Rapid Project Design

The Design Center at Marshall's Program Development Office is complete and its doors are officially open. This facility provides the Center with a new collaborative engineering capability for the rapid design of new projects, said Axel Roth, Program Development Directorate director at Marshall. The Design Center also permits video and teleconferencing capabilities in the"Smart Conference Room."

"It will facilitate the simultaneous participation of multiple users at different sites throughout the world via the Internet," Roth added. The initial project to use the new Design Center is the Rocket Based Combined Cycle Vehicle Concept Study.

Program Development Announces Hot Line

New ideas and suggestions regarding Marshall's Program Development (PD) Directorate can now be communicated via PD's Hot Line. This Hot Line can be used to address customer service improvements, marketing skills, help you define a concept or sell an idea. For more information, call PD's Hot Line contact Terry Mitchell at 544-3962.

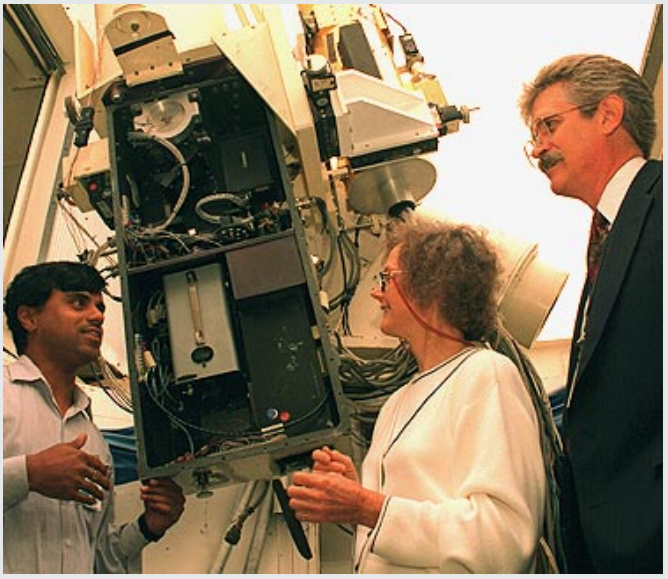


Photo by Emmett Given

Udaipur Scientist In Residence at Marshall

Dr. Debi Prasad Choudhary, left, began a one-year tenure in the National Research Council Research Associateship Program, administered by Marshall University Affairs Officer Dr. Jim Dowdy, right. Choudhary, from the Udaipur Solar Observatory in Usaipur, India, will be working with his advisor, Dr. Mona Hagyard in the Solar Physics Branch in Marshall's Space Sciences Laboratory. The title of Choudhary's proposed reasearch is "Magnetic and Velocity diagnostics of the Flaring Sites in the Active Region."

NASA Awards Five Firms George M. Low Award

Five aerospace companies were awarded the space agency's highest honor last week for excellence and quality. NASA Administrator Daniel S. Goldin presented the 1998 George M. Low Award to the companies at the thirteenth annual NASA Continual Improvement and Reinvention Conference on Quality Management in Alexandria, Va.

The award, established in 1985, is NASA's highest quality and excellence award for contractors and subcontractors, and the oldest award for organizational quality.

ILC Dover Inc., Frederica, Del., received the award in the large business, product category; and Allied Signal Technical Services Corporation, Lanham, Md., and DynCorp, Johnson Support Division, Houston, Texas, both received the award in the large business, service category. In the small business, product category BST Systems Inc., Plainfield, Conn., received the award; and Advanced Technology Company, Pasadena, Calif., received the award in the small business, service category.

"These companies exemplify excellence and outstanding achievements that prove beneficial to NASA and the nation's industry," said Goldin.

"Each of these companies has definitely made a positive impact on NASA's performance goals," said Frederick D. Gregory, Associate Administrator for Safety and Mission Assurance at NASA Headquarters.

Upcoming Events

Today Is Last Day to Submit CFC Campaign Slogans

Today is the last day to submit slogans for the 1998 Tennessee Valley Combined Federal Campaign (CFC). The winning slogan will be used as a planning theme for the 1998 CFC Drive. The winner will receive recognition and a prize awarded by the Tennessee Valley CFC executive director. Slogans should be short, concise and submitted to: *cathy.nichelson@msfc.nasa.gov*

Marshall's Open House '98 Committee Seeks Help Distributing Flyers

The Open House Committee needs help in spreading the word about Open House '98 to your friends and neighbors in the local community. If you would like to help distribute Open House flyers, visit the Open House website or contact Michele Fowler by e-mail or call 544-0392.

Marshall's Open House is set for 9 a.m. to 6 p.m. May 16. Visitors will be able to see the Space Station being built, meet astronauts, see rocket tests and visit Mission Control Huntsville, in addition to a host of other exciting activities.

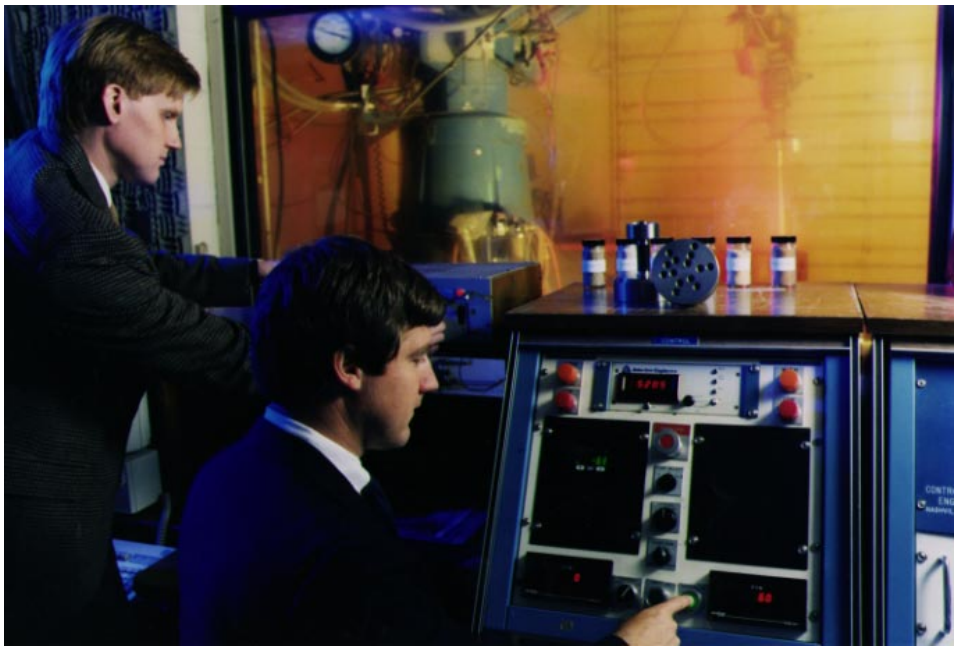
Retirees interested in volunteering should call Billie Swinford at 4-0087.

The web address is: **http://www.msfc.nasa.gov/openhouse.** For more information on the Open House, call 1-888-901-NASA.

Marshall Star Welcomes Story Ideas, Articles

If you have an article or story idea for publication in the *Marshall Star*, please call Ann Marie Bryk at 544-0030, e-mail ann.bryk@msfc.nasa.gov, or send ideas to the Internal Relations and Communications Office, attn. Marshall Star, CO40.

The *Marshall Star* is published on Wednesdays and contributions should be submitted no later than Friday noon, prior to the next week's publication.



Materials and Processing Laboratory employees Steve Burlingame (left) and David Hoppe initialize the High Pressure Water Cleaning System to prepare for cleaning shuttle booster components. This system will be one of the topics presented during TABES '98 next week. ***Photo by Dennis Keim***

TABES '98

Continued from page 1

products and for fun, a simulator that allows visitors to try their hand at landing the Shuttle Orbiter.

Other displays include the Advanced Space Transportation Program, Marshall Center, Space Flight Awareness and 1:8 scale X-33 model.

The Space Symposium will be held from 2-4 p.m. Wendell Colberg of Marshall's Productivity Enhancement Complex (PEC), along with John Vickers, Seth Lawson and Frank Zimmerman from Marshall's Materials and Processes Laboratory, will present an update on composites manufacturing techniques being used at the PEC. Fabrication methods, materials selection and future uses will be discussion focal points.

Presenters also will discuss the Advanced Composite Manufacturing Processes available at the PEC. Current manufacturing capabilities include nonmetallic components using automated tape wrap, filament winding, automated tape laying, fiber placement and hand layup. A large variety of composite parts in numerous shapes and sizes can be manufactured at the PEC for research, development and production.

Excellence in science research is one of NASA's greatest success stories. John Horack of Marshall's Space Sciences Laboratory will discuss Earth, space and microgravity sciences' latest scientific achievements. He will also share why it's just as important for scientists to effectively communicate advancement of science to a wide variety of audiences as it is to advance the state of science itself.

Jeff Ding of Marshall's Material and Process Laboratory will discuss the emerging technology and applications associated with friction stir welding. His groundbreaking work in welding various alloys in a range of thicknesses is considered to have significant potential industry use.

Marshall's Acting Director Carolyn Griner will be the guest speaker at the Space Club luncheon, Tues., May 12 noon-1:30 p.m.

Many other presentations and exhibits are scheduled during the two-day event. Hands-on training will be offered by the Alabama Industrial Development Training Institute, plus people can get a close-up look at the Patriot, THAAD, Avenger and other large equipment. Exhibit hours are 9 a.m.-7 p.m. Tues., May 12 and 9 a.m.-4 p.m. Wed., May 13. Visit the TABES '98 website at: *www.tabes.org* for details.

Employee Ads

Miscellaneous

★ Fiberglass, flatbottom canoe w/trailer, $200. 895-9520
★ 18' Glasstream 182 Caravelle 1989, 175hp, I/O, $6,000. 722-0417
★ Ski boat, '88 Caravelle 185, I/O, sundeck, 175hp Chevy 4.3L, $4,800. 757-8163
★ Glaspar 17' Runabout, 115hp Johnson w/power trim, walk-thru windshield, depth finder, skis, $1,450. 883-8257
★ Baldwin "Orga-Sonic" organ, two keyboards, 30+ stops, $350 o.b.o. 881-6094
★ Queen sleeper sofa w/loveseat, light blue/off-white striped, 4 yrs old, $300 o.b.o. 505-0129
★ Antique oak 48" round table w/ 4 chairs, $450; Maytag washer/gas dryer, $250; GE washer/gas dryer, XL capacity, 7 mo. old, $600. 757-8163
★ Home-built wood turning lathe, $20. 539-7855
★ Whirlpool washer/dryer set approx.15 yrs. old, $50 pair; O'Sullivan entertainment center, $50. 722-8437
★ Personal computer 386, ComputerStar, NB24-15, printer, color monitor, Windows 3.1, complete system, $200 firm. 828-4564
★ Golf clubs "Lynx" Master, 2-8, PW, new grips, $65. 350-7461
★ Aluminum windows, 3'x6', $30. 505-0129
★ Entertainment center, cherry wood, 76"Hx36"Wx24"D, $1,000. 864-3133
★ 1988 Dynatrack fish & ski boat, 17'6", fully equipped, $5,100. 340-6088 pager, 306-0194.
★ White gold ring guard, approx. one karat total weight diamonds, $475. 771-7319

Vehicles

★ 1996 Monte Carlo Z-34, leather seats, alloy wheels, loaded, $14,500 o.b.o. 350-8607
★ 1996 Pontiac Transport van, loaded, $12,500. 830-8339
★ 1995 Oldsmobile Delta 88, estate sale, 29K miles, one owner, loaded, all power, $14,500. 350-1266 or 351-0869
★ 1995 Buick Park Avenue Ultra, loaded, one owner, 79K miles, $17,500, leave message. 536-5100
★ 1994 Cavalier wagon, 83K miles, $4,500. Wallace (931) 427-8046
★ 1994 Acura Integra LS, 4-dr, 88K miles, $8500. 505-0129
★ 1993 Honda Accord LX, 5-spd, 88K miles, $7,300. Wallace (931) 427-8046
★ 1991 Ford Taurus GL, V6, 4-dr, blue, AC/PW/PL, AM/FM cassette, leave message. 830-8354
★ 1991 Jeep Laredo 4x4, 4.0L, AT/PW/PL, Hunter green, 112K miles, $6,900. 230-0503
★ 1990 Ford F-150, white, 5-spd., Michelin tires, low miles, $6,900. 858-9535
★ 1989 BMW 535i, white, 5spd, $10,900. 858-9535
★ 1989 Oldsmobile Delta 88, loaded, $1,995. 922-0958
★ 1989 Ford Taurus wagon, 114K miles, new paint, AC/PW, one owner, $2,500. 881-5088
★ 1986 Cavalier station wagon, dependable, $2,000. 430-0341
★ 1984 Ford van E-350, 1-ton, new engine, 4kw generator bi ,AC, set up for camping, $7,300 o.b.o. 883-5750

Wanted

★ Rototiller, front wheel drive type w/counter rotating blades. 881-6390
★ Two female AKC Golden Retriever puppies. 828-9494 or 859-2610
★ Utility trailer 5'x8'. 881-6390
★ Tennis partner who likes to play regularly. 881-9173 after 7 p.m.

Found

★ Car key, parking lot of Bldg. 4203. 544-4758
★ Gold bracelet, chain style, Bldg. 4203, Design Ctr, rm. 6220, call to identify. 4-0583
★ Bracelet, Bldg. 4201, call to identify. 4-0434

Center Announcements

☛ ***MARS Ballroom Dance Club*** — The MARS Ballroom Dance Club will offer intermediate Mambo and Merengue lessons, 7 to 8 p.m. and beginners' Foxtrot and Triple Swing lessons, 8 to 9 p.m. on May 4, 11, 18 and 25. The classes will be held in the Parish Hall of St. Stephen's Episcopal Church at 8020 Whitesburg Drive. These lessons are available to club members and their partners/guest at $8 per person. For more information call Pat Sage at 544-5427.

☛ ***Facilities Retirement Breakfast*** — The Facilities Retirement Breakfast will be at 8 a.m. on May 12 at Shoney's Restaurant at University Drive and Memorial Parkway.

☛ ***Lunch & Learn*** — Marshall's Employee Assistance Program will offer the next Lunch & Learn Seminar on May 7, noon-12:45 p.m., Bldg. 4200, room P-110. The Taxpayer Relief Act of 1997 and how it affects retirement planning will be the topic of discussion. Speaker Dwight Maxwell, assistant vice president and senior financial consultant with Merrill Lynch, Huntsville, will discuss retirement planning (Roth IRAs), investment planning (capital gains), estate planning (increase in the estate and gift tax unified credit), education planning/child tax credit, and other provisions of the new tax act. All Marshall employees, on-site contractors and family members are invited to attend.

☛ ***Toastmasters' International*** — The NASA Lunar Nooners Toastmasters Club will meet May 12 at 11:30 a.m. in the Bldg. 4610 cafeteria conference room. All Marshall Center employees, contractors and friends are invited to attend. For more information, call Debbie Hagar at 539-4499, or Lee Johns at 544-5142.

☛ ***Public Inquiries*** —Please visit the Public Inquiries Office located in Bldg. 4200, room 101. Imagine better disease-fighting drugs and medicines, a movie studio where out-of-this world effects won't be just "special effects" and booking your accommodations at a bed and breakfast in space--a place to rest and relax after a round of golf without the effects of gravity. Read about these and more in the Advanced Space Transportation Program brochure. Other publications and handouts related to Marshall and NASA are available.

☛ ***New toll-free 877 area code*** — Effective April 4, AT&T introduced a new toll-free area code, 877. The MSFC and MAF telephone switches have been programmed to recognize out-going calls to area code 877. AT&T now has three toll-free area codes, 800, 888, and 877.

Job Opportunities

Reassignment Bulletin 98-19-JB, AST, Technical Management, GS-801-13, Space Shuttle Projects Office, Reusable Solid Rocket Motor Project, Business Management Office. Closes May 13.

CPP 98-46-CV, Supv. AST, Flight Systems Test, GS-861-14, S&E, Structures & Dynamics Lab., Structural Test Div., Quasi-Static Test Branch. Closes May 6.

Reassignment Bulletin 98-10-DC, AST, Technical Management, GS-801-12/13, Microgravity Research Program Office, Program Planning and Control Office. Closes May 14.

Reassignment Bulletin 98-18-DC, AST, Mission Operations Integration, GS-801-14, Microgravity Research Program Office. Closes May 14.

CPP 98-50-RE, AST, Flight Systems Test, GS-861-14, S&E, Propulsion Laboratory, Propulsion Test Division, Propulsion Test Mechanical Systems Branch. Closes May 7.

CPP 98-49-RE, AST, Electronic Instrumentation Systems, GS-855-14, S&E, Propulsion Lab., Propulsion Test Division, Propulsion Test Control Systems Branch. Closes May 7.

MARSHALL STAR

Marshall Space Flight Center, Alabama 35812

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